REVIEWS

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The Volume opens with an illuminating article by Linus Pauling. Pauling makes revealing observations on the impact of science policy on the development of molecular biology at California Institute of Technology.

The issue has 16 other articles describing developments in physical methods for explaining biological phenomenon, theoretical approaches to the evaluation of biomolecular interactions, hypotheses and proposals for the explanation and understanding of the function of biological molecules and their complexes.

The article on chromosome classification and purification using flow cytometry and sorting techniques describes the most recent advances on isolation, purification, data analysis and instrumentation. Electron microscopy of frozen, hydrated biological specimens is required to minimize the distortion of molecules induced by dehydration and to allow the exploitation of the full power of the transmission electron microscopy for imaging. The necessary instrumentation and techniques are given. Protein channel function that controls the flux of ions through biological membranes is lost upon the membrane disruption. Hence, a critical appraisal of biochemical channels requires reconstitution of planar phospholipid bilayers and channel proteins between two aqueous compartments. The related techniques and recent results are detailed. Wall and Hainfeld describe their attempts to use the scanning electron microscope for imaging and measurement of mass of single biological macromolecules and contrast their method to other methods such as chromatography, or scattering experiments with light, x-rays or neutrons. The applications of NMR for studies of tissue metabolism are dealt with.

The large number of DNA, RNA and protein sequences that have recently become available contain a wealth of information on the evolution and function of biological macromolecules. The methods of analyzing and comparing these sequences are described. Theoretical analysis of electrostatic interaction, although central to the function of many biological assemblies, are complicated by difficulties of modelling solvent effects and dielectric properties. The theoretical aspects of these interactions as applied to membranes and proteins are dealt with. Theoretical methods that might be of use in the prediction of the secondary structure of integral membrane proteins of known amino acid sequence, are described. Some of the theoretical aspects of biological ion flux data are also dealt with.

The three-dimensional structure of citrate synthatase as determined by the x-ray diffraction studies on its single crystals and the structure-function relationship of this enzyme are covered.

A variety of other articles propose models and explanations for different biological phenomena, in terms of the accumulated experimental data. These include a discussion on antifreeze glycoproteins in polar fish blood, muscle contraction, the role of nuclear matrix in the function of DNA, etc.

As usual, the 1986 issue of the review should prove to be a source material for research to investigators interested in the structure and function of biological macromolecules and their assemblies.

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